Amendment to the Specification:

Please replace paragraph [0005] with the following amended paragraph:

[0005] Several methods have been developed using microfluidics that are capable of detecting the presence of or interactions between molecules in an analyte solution. The primary method for measuring non-reactive interactions, such as binding, of analytes in solution has been through the use of labels or tags in a ~~heterogenous~~ heterogeneous format. Briefly, a labeled analyte is contacted with a prospective binding partner. The bound label is then separated from any free, *e.g.*, unbound, label in a separation step, such as by chromatography, electrophoresis, or by tethering one or the other component to a solid support followed by a washing step. The disadvantage of these ~~heterogenous~~ heterogeneous formats is that they require additional time and labor-intensive steps.

Please replace paragraph [0069] with the following amended paragraph:

[0069] In many cases, running the assay in the presence of a gel or other sieving matrix can increase the diffusvity ratio of two differently sized molecules. In general, a molecule traveling through a sieving matrix must negotiate a tortuous path defined by pores within the matrix. If the pore size of a sieving matrix is large compared to a particular molecule, then the diffusivity of that molecule will not be significantly affected by the presence of the matrix. On the other hand, the diffusivity of a molecule can be ~~increased~~ decreased by as much as an order of magnitude if the molecule is large enough to have its movement impeded by the matrix. Thus, by employing an appropriate sieving medium in embodiments of the invention, the diffusivity ratio of a large molecule and small molecule can be increased. Sieving matrices that decrease the diffusivity of DNA, RNA, and protein molecules are commercially available in the form of gels. So, for example, a particular protein-ligand bonding pair that has a diffusivity ratio of 2 to 3 in solution might have a diffusivity ratio of 20 to 30 in a protein gel that decreases the diffusivity of the protein but does not significantly effect the diffusivity of the ligand. A sieving matrix such as a protein gel could fill all or a portion of conduit 100 in the embodiment of Figure 2.

Please replace paragraph [0105] with the following amended paragraph:

[0105] In order to ascertain the background or baseline fluorescence conditions, a first run was conducted using injections with buffer in side channels 504 and 506. For these first set of experiments, 50 mM HEPES was loaded into wells 508 and 516, while alternately sipping 50 mM HEPES (buffer) and 5 μM Bi-T_{10}-Fl (sample) from wells of a microtiter plate (not shown). Prior to sending a pulsed series of sample injections into the device via the sipper, a reference level of fluorescence was taken by continuously sipping a Bi-T_{10}-Fl sample until a steady signal was achieved, as shown in Figure 7, which illustrates the fluorescence signal on the y-axis ~~verus~~ versus time. The reference level of fluorescence was used to normalize the injection data.